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SOME QUESTIONS ANSWERED RELATIVE TO

STOMACH WORMS IN SHEEP

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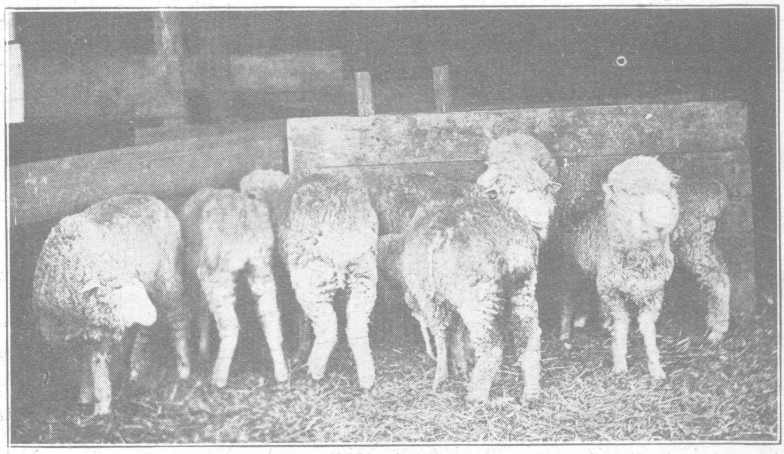
Q. What is the most destructive parasite of sheep in Ohio?
A. The stomach worm. *(Haemonchus Contortus).*

Q. What is the appearance of the stomach worm?
A. It is a small, thread-like worm from ½-inch to ⅞-inch in length, whitish in color. The females are larger than the males.

Q. Where is it found?
A. In the fourth or true digestive stomach.



Seven sheep remaining from a flock of 251 entering the winter of 1919-20; the rest died from stomach worms. (Photo taken May, 1920.)

Q. What is meant by the fourth stomach?
A. Like all ruminants, a sheep has four stomachs—or rather, its stomach is divided into four compartments. The first, rumen or paunch, is much the largest. It serves as a storage reservoir for partially masticated food. A small portion of the food is regurgitated for further chewing. This constitutes rumination and is continued until the food has arrived at its required fineness, when it passes into the second compartment, the reticulum. The third compartment is the omasum or manyplies.

Q. What are the uses of the reticulum and omasum?
A. They prepare the food for digestion, which takes place in the fourth compartment—the abomasum.

Q. How about liquid foods and drinking water?
A. They pass directly into the fourth stomach thru a groove in the walls of the other three.

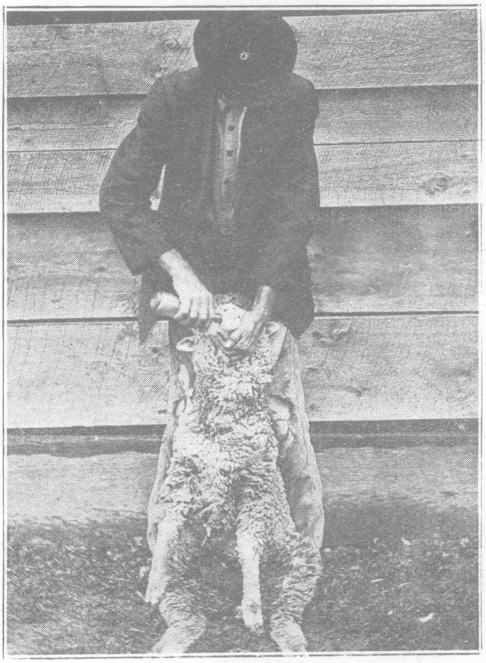
Q. Does that have any bearing on the stomach worm?
A. It has when we consider the method of treatment.

The Ohio State University, Cooperating with United States Department of Agriculture, Agricultural College Extension Service, H. C. Ramsower, Director, Columbus, Ohio. FREE—Cooperative Agricultural Extension Work—Acts of May 8 and June 30, 1914.

Q. How does the stomach worm reproduce itself?
A. The female deposits eggs which are passed with the excretions and dropped on the pastures. Eggs will hatch in from a few days to several weeks, depending upon weather conditions. A warm, moist atmosphere facilitates and cold, dry air retards hatching. At a continuous temperature of 90° F. with normal humidity, hatching takes place in two or three days. At a temperature of 40° F. eggs will not hatch and the larvae remain dormant.

Q. After hatching, what becomes of the larva?
A. It crawls up on a blade of grass where it ensheaths itself. In this state it is quite resistant to unfavorable weather conditions. The sheep grazing on pasture swallows the larva with the grass. Once in the stomach the larva develops into a mature worm, thus completing its life cycle.

Q. Can the parasite reproduce itself outside of sheep?
A. No. Only mature worms deposit eggs, and the parasite never matures until it reaches the sheep's stomach.



Wrong way to drench a sheep

Q. What is the most favorable factor to the development of the stomach worm?
A. Permanent pastures on which sheep are kept more or less continuously during the summer months. Eggs are constantly being deposited with the droppings. Sheep consume the infected grass and become reinfested with a fresh brood of parasites. This process of reinfestation continues as long as sheep are kept on the old pasture.

Q. What season of the year are they most common?
A. They are present in all seasons, but most severe losses occur during late summer, fall, and early winter.

Q. Does the presence of stomach worms always cause disease?
A. A slight infestation will cause no perceptible injury. The extent of injury caused by the parasite depends upon the number present and the otherwise thrifty condition of the sheep.

Q. How do they cause disease?
A. They attach themselves to the walls of the stomach, and set up a slow inflammation which interferes with digestion. The animal is unable to assimilate its food, becomes weak and emaciated, and usually dies of anemia.

Q. What are the symptoms of stomach worms?
A. The mucous membranes of the eyes, nose, and mouth are pale, the skin loses its healthy pink color; in advanced stages it is dry and harsh and the wool is easily pulled off. The affected sheep is unable to keep up with the flock. Diarrhea is usually present. The animal gradually becomes weaker, stands without moving unless forced to do so, finally gets down and is unable to rise without assistance. Occasionally in the advanced stages dropsical swellings appear along the abdomen or under the jaw and neck. Extreme weakness is a characteristic symptom.

Q. Will a post-mortem examination help in making a correct diagnosis?
A. A post-mortem examination renders a diagnosis positive. One of the sick sheep should be killed and the examination made immediately. After the sheep has been dead a few hours it is difficult and usually impossible to find the worms because they soon die and disintegrate.

Q. How should the examination be made?
A. Find the fourth or last compartment of the stomach. Tie a string around intestines 2 inches from stomach, also tie a string around other end of stomach. This keeps the contents from flowing out when the stomach is removed. After removal it is held in a vertical position, the upper string is loosened, some water poured into it and the string again tied. It is then placed on a flat surface, an incision is made in the upper surface for the full length of the stomach and the edges laid back. In a few moments the worms may be observed wriggling in the fluid contents.

Q. Can stomach worms be prevented? If so, how?
A. A heavy infestation may be prevented by frequent change of pasture. It has been stated that the eggs hatch slowly in cold weather and quickly in a warm atmosphere. It is deemed safe to keep the flock in one pasture during the month of April. During May they should be changed every 2 weeks, in June every 10 days, in July and August every week, in September every two weeks, and in October, as in April, they may occupy the same pasture the entire month.

Q. Is it safe to return a flock to a pasture occupied earlier in the season?
A. Later in the summer a flock may be turned into a pasture the second time, provided in the meantime, other livestock had been grazing on it, consuming the infected grass.

Q. What is the best treatment for stomach worms?
A. One percent solution of copper sulfate, commonly spoken of as bluestone or blue vitriol.

Q. How is the solution prepared?
A. Dissolve 4 ounces of copper sulfate in 2 quarts of hot water, then add sufficient cold water to make 3 gallons.

Q. Will any copper sulfate do?
A. It is better to use the blue crystals than those which have turned grayish thru exposure. A fresh solution should be prepared every time the treatment is administered.

Right way to drench a sheep

Q. What size dose should be given?
A. From 1½ to 2½ ounces of the solution. Three ounces may be given to very large sheep. The smaller dose is for lambs up to 8 months of age. After that 2 ounces is the average dose.

Q. Which is the best method of drenching sheep?
A. The simplest and safest method of drenching sheep is with a plunger syringe. A 2-ounce syringe (either metal or hard rubber), having a short thick nozzle with a rather larger opening is very satisfactory, as it serves the double purpose of measuring the dose and administering it.

Q. How should the sheep be held?
A. Back the sheep into a corner, stand astride it, grasp both sides of the head, holding it firmly and slightly elevating it; leave lower jaw and tongue free to facilitate swallowing. Insert the nozzle of the syringe into the back part of the mouth on top of the tongue. Slowly inject the solution. The sheep can swallow it easily and naturally. Do not use force on the syringe and squirt the medicine as it is likely to go down the trachea into the lungs, strangling the sheep.

Q. What is the objection to setting sheep on their haunches or laying them on the ground for drenching?

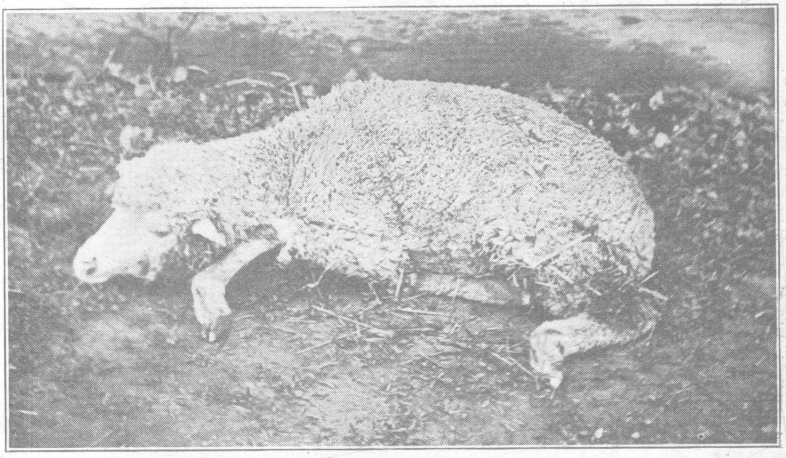
A. There are two serious objections: first, there is great danger of the fluid entering the lungs and killing the sheep, when they are held in an unnatural position; and second, experiments with colored water have demonstrated that most of the fluid will enter the paunch, to be mixed with its contents instead of passing directly into the fourth compartment of the stomach where it is needed.

Q. Are capsules or tablets of copper sulfate equally efficient?

A. No. As previously stated, solids enter the paunch and become mixed with its contents. The liquid form passes directly into the fourth stomach and comes in direct contact with the parasite.

Q. How should sheep be prepared for the treatment?

A. They should be deprived of all feed for at least 24 hours, in order that the stomach may be as nearly free of contents as possible. Water may be given freely.



Sheep in the last stage of stomach worm disease

Q. How often should the treatment be administered?

A. In severe cases the treatment should be repeated in one or two weeks.

Q. When is a good time to treat?

A. Treatment should be applied twice a year; first, in the spring before turning them out to pasture. That helps to prevent pasture infestation; second, in fall when taken off pasture. This will eliminate the worms that may have been picked up from the pasture during the summer.

Q. May other ingredients be added to the copper solution?

A. Some add mustard for the purpose of inducing an increased peristaltic movement of the stomach, thereby more rapidly expelling the worms which have been killed by the copper solution.

Q. Is there any other treatment?

A. Gasoline was formerly considered quite successful. It possesses the disadvantages of having to be administered in a medium like milk, the dose must be repeated frequently, and sometimes results fatally to the sheep. If gasoline must be used, only high test gasoline or petroleum benzine will give satisfactory results, the ordinary commercial gasoline having been proved valueless as an anthelminthic.